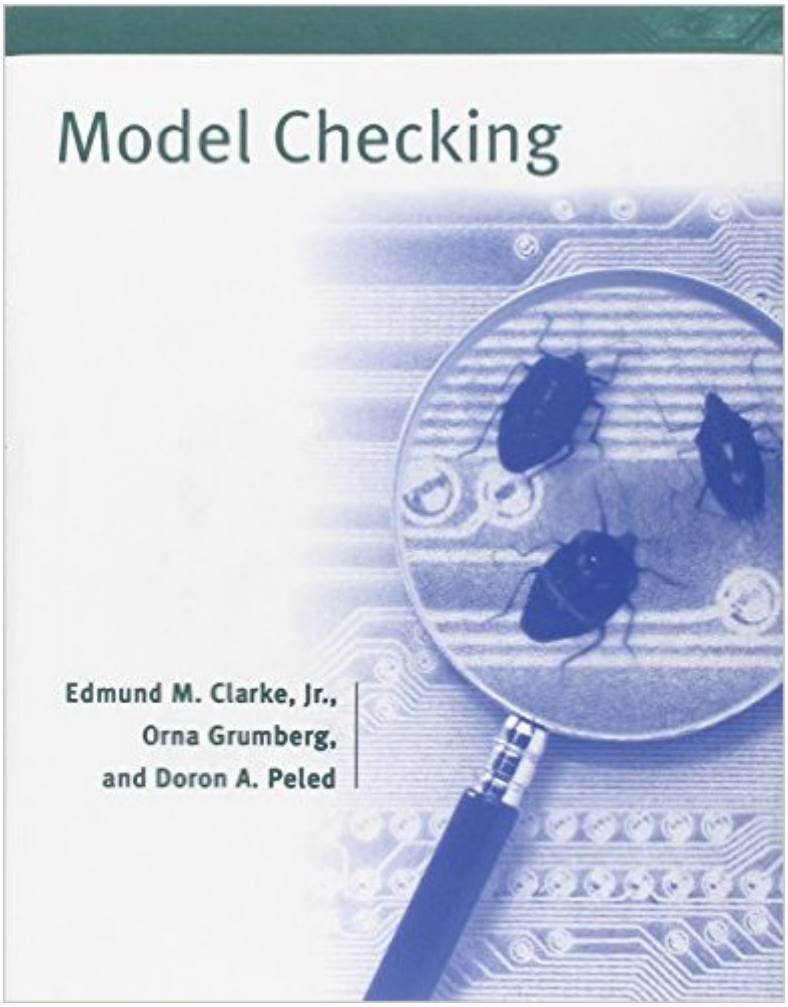
Model Checking (MIT Press)



Synopsis

Model checking is a technique for verifying finite state concurrent systems such as sequential circuit designs and communication protocols. It has a number of advantages over traditional approaches that are based on simulation, testing, and deductive reasoning. In particular, model checking is automatic and usually quite fast. Also, if the design contains an error, model checking will produce a counterexample that can be used to pinpoint the source of the error. The method, which was awarded the 1998 ACM Paris Kanellakis Award for Theory and Practice, has been used successfully in practice to verify real industrial designs, and companies are beginning to market commercial model checkers.The main challenge in model checking is dealing with the state space explosion problem. This problem occurs in systems with many components that can interact with each other or systems with data structures that can assume many different values. In such cases the number of global states can be enormous. Researchers have made considerable progress on this problem over the last ten years.This is the first comprehensive presentation of the theory and practice of model checking. The book, which includes basic as well as state-of-the-art techniques, algorithms, and tools, can be used both as an introduction to the subject and as a reference for researchers.

Book Information

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Customer Reviews

This book has long been considered as a must read before doing research in this field. Without doubt, it contains all you need to know about model checking in general. However, it is a little difficult to read for beginners, and also, since it was written 10 years ago, some new advances are not included. Moreover, it puts more emphasis on CTL than LTL, or more "states" than "paths". It is OK, but more difficult to introduce fairness and infinite paths. Personally, I recommend "Principles of Model Checking" by Christel Baier. But still, you may need a copy of this one in your bookshelf.

This book is horribly difficult to read, it is very terse. I found that I could easily follow the things I knew already, but it is not a good book to learn new things from. It is a collection of research results, in a sensible order, but little effort has been made to explain things to the novice. In fact there are research papers which introduce more advanced topics than covered here, and are much easier to read than this book (for example Alur's paper on ATL). It is probably good as a comprehensive reference if you are already familiar with the techniques. It is a shame as there seems to be no other comprehensive book available on model checking. The most accessible introduction remains Manna and Pnueli's "Temporal Verification of Reactive Systems", although it only has one chapter on model checking.

This is one of the more comprehensive references on model checking. It covers most of the main technqiues used in model checking. It does not cover bounded model checking which became popular after the publication of this book.The writing style and the explanations in the book could be much better. You just need some patience in reading the book. Overall, I think this book is a useful reference to researchers and practitioners in the field.This book, however, is NOT for some one who is new to the field. For those who are new to Model Checking and Formal Verification, I strongly recommend "Introduction to Formal Hardware Verification" by Thomas Kropf.

This is a very famous book from a Turing award winner and from world renown experts. It is by the time still valuable. But I do not consider it as a first-approach for undergraduates.

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